

THE AMERICAN JOURNAL OF PHARMACY

SEPTEMBER, 1908

NATURAL SALICYLATES.

BY DR. GEO. R. PANCOAST AND W. A. PEARSON.

In a former report on "The Adulteration of Volatile Oils" (AMERICAN JOURNAL OF PHARMACY, May 1908; *American Druggist*, April 27, 1908), the problem of the detection of synthetic methyl salicylate in admixtures of oils of birch and gaultheria was mentioned.

Since the so-called natural salicylates have met with such widespread favor as therapeutic agents, there has been a tendency on the part of a few unscrupulous distillers, dealers and drug merchants, to substitute the low-priced synthetic products. This tendency has more rapidly grown as there has been no accurate means of detecting the sophistication.

For some years chemists have endeavored to detect the presence of synthetic methyl salicylate when added to oil of birch or gaultheria, but, owing to the great similarity of these products, the task has been very laborious. All three of these products contain at least 99 per cent. of absolute methyl salicylate.

Oil of gaultheria also contains small quantities of a paraffin (triacontane $C_{30}H_{62}$?), an aldehyde or ketone, a secondary alcohol ($C_{30}H_{60}O$), and an ester ($C_{14}H_{24}O_2$) according to Power and Kleber. The ester is possibly responsible for the optical rotation.

Oil of birch contains about 99.8 per cent. of methyl salicylate and in addition the same paraffin and ester, but not the alcohol.

Synthetic methyl salicylate contains probably ortho- and meta-

creosotic acids as its chief impurities, and to these a great deal of the ill effects is undoubtedly due.

It can be readily seen that the detection of admixtures is exceedingly difficult and several methods are here considered.

(a) By means of the differences in optical rotation. It is very improbable that any instrument could positively identify even 50 per cent. of oil of birch or methyl salicylate in oil of gaultheria. The very slight optical rotation could easily be adjusted by the addition of a very small amount of a strongly lævo-rotatory product.

(b) The bead test is of some importance in quickly forming an opinion as to whether sample is synthetic methyl salicylate. This test consists of violently shaking the container and noting the rapidity with which the foam disappears. Synthetic methyl salicylate produces a foam which rapidly disappears, while the foam from a natural oil has much more permanency. This test is not reliable, as small amounts of certain mixtures can be added which will produce the proper bead.

(c) Color Reactions. Many color reactions have been tried with more or less success. One which gave us distinguishing colors on samples known to be authentic, consists in treating one drop of the oil with two drops of hydrochloric acid and rapidly rotating in a small evaporating dish, add one drop of nitric acid and again rapidly rotate, then two drops of sulphuric acid and again rotate. Pure oils gave a yellow final color, while synthetic methyl salicylate gave a pink.

Another reaction which may prove advantageous with some modification, is the play of colors seen when a drop of the oil is treated with sulphuric acid containing one per cent. of formaldehyde.

(d) Physical Constants. The physical properties, such as specific gravity and boiling point, are not of much value in detecting methyl salicylate in oil of birch or gaultheria, although the United States Pharmacopœia requires synthetic methyl salicylate to have a higher specific gravity.

(e) Odor Tests. One of the best ways of identifying these products, and even their admixtures, is to educate the sense of smell. The three products each have a characteristic odor, which, while different in various samples, is yet quite prominent for each kind. Pure oil of gaultheria has a very heavy, not particularly strong, odor, but one which is quite persistent. Oil of birch has a sort of

peppery, woody odor, yet not so sharp as the synthetic methyl salicylate. Methyl salicylate has a rather sharp, even more agreeable, odor than the others. The difference in the odors can be more readily recognized by taking accurately 1 c. c. of each, and mixing with separate portions of 100 grammes of powdered sugar, or by dissolving 1 c. c. in 50 c. c. of alcohol and pouring into 1 liter of water. Another thing that should be noted is the relative turbidity of these mixtures. Synthetic methyl salicylate will usually become clear before either oil of birch or oil of wintergreen. These solutions may be diluted with a larger amount of water and the relative odor intensity of the very dilute solutions noted.

(f) Cone's Test. This test is of much value in passing on the quality of an oil. We believe it is reliable within certain limits if certain details are very carefully complied with. The test has been published in the AMERICAN JOURNAL OF PHARMACY, 1903, page 406.

Two stock solutions are required:

No. 1.	
Caustic soda	320 c. c.
Water q. s.	4,000 c. c.

No. 2.	
Hydrochloric acid	1,280 c. c.
Water	4,000 c. c.

Place 6 c. c. of the oil in a 500 c. c. round bottomed flask and add 25 c. c. of solution No. 1 and 25 c. c. of water. Boil till clear. Pour in 350 c. c. of hot water and bring to a boil. Now add 25 c. c. of solution No. 2 and boil for a few moments, then set aside in a moderately warm place, so that crystallization will be slow.

A pure oil will give the characteristic large, square-ended, laminar, opaque crystals which occupy comparatively little space. Methyl salicylate under same conditions will give fine, needle-shaped, voluminous, opaque, fluffy crystals, which occupy nearly all of the flask.

Mixtures of the pure oil with synthetic methyl salicylate give gradations between these extremes, and by making tests on admixtures of known strength, crystals from a given sample may be compared and an intelligent idea obtained of the proportion of adulteration.

Several trials should be made with each sample. We have found that certain details must be carefully watched; namely, having a

slight excess of oil after saponification is complete, also in not losing any hydrochloric acid by excessive ebullition while it is being added. All measurements must be made accurately. One indication of a genuine oil of birch, is the formation of a transient pink color when about half the hydrochloric acid has been added, also the characteristic woody odor at the same time. It is true that irregular results are sometimes met with, but no doubt they are often due to some little fault in manipulation.

(g) General. It has been suggested that the natural salicylates are more loosely combined, or have a different structural arrangement, than the synthetic product, and this may lead to a positive means of identification. The natural oils are undoubtedly formed from the decomposition of glucosides, by either water or ferments, or both, while the synthetic product is made in a very different manner. It would seem from their different action, that there was a more important factor than the small difference in composition would indicate. Physicians, as a rule, prefer the salicylates made from true oil of birch or gaultheria and are perfectly willing to pay the corresponding higher price, as many state positively that clinically salicylates from true oils give better results.

Another distinction of natural salicylates is that they are slippery when ground in a mill, while salicylates made from synthetic methyl salicylate are dry and irritating.

One of our main difficulties was in obtaining a supply of oils of birch and gaultheria for experimental work, that we were positive was authentic. We personally distilled some oil of gaultheria and obtained undoubtedly genuine oil of birch from several sources.

Oil of birch frequently comes to us of dark red color. This is supposed to indicate the genuineness of the sample, but frequently it is thus colored by the addition of a very small quantity of ferric chloride. A trace of tartaric acid will remove this color. Some samples are said to be colored with red sanders, but we were unable to color the oil by this means, as the coloring matter does not appear to be soluble in the oil.

We are indebted for much of the information here presented to many who, like ourselves, are anxious to solve the problem of the detection of spurious "Natural Salicylates."

RESEARCH LABORATORY,

SMITH, KLINE & FRENCH Co., July, 1908.

SOME NEW WORK BY GORIS ON KOLA.

BY A. R. L. DOHME.

Most of us who have worked on this once interesting drug have more or less lost interest in it, because the value of the drug appears to be more and more questioned, and, in consequence, less used in medicine. Perhaps this is due to the fact to be brought out in this paper, that fresh kola was preferred to the dried drug, as has been the case with numerous drugs in recent years. It is an open question whether, in most cases, the fresh drug has any advantages, and, if not, perhaps it has some disadvantages, as in case of kola, under the cured dry drug. The French Chemical Society offers annually prizes for the best researches in Industrial Chemistry, Organic Chemistry, Pharmaceutical Chemistry (two prizes, one for discovery of new products and one for discovery of new methods), Chemistry of Tanning, Chemistry of Wines, Spirits, etc. This year's prize for Pharmaceutical Chemistry (new products) was awarded to Mr. Goris, of the School of Pharmacy of Paris, for the discovery¹ that there exists in fresh kola nuts a crystalline tannin-containing substance, kolatine, which is combined chemically with caffeine, as kolatine-caffeine, an unstable body capable of decomposition into kolatine and caffeine by boiling with chloroform or water. Kolatine can only be made to advantage if the fresh nuts are sterilized at 110° C. in an autoclave before extraction, so as to kill all the ferments it contains, and which split up the constituents on curing, standing or drying. Kolatine is difficultly soluble in water, very soluble in methyl and ethyl alcohol, acetic acid and acetone, extremely little soluble in ether, and insoluble in benzine, chloroform or ligroin. It melts at 180° C. and with Fe_2Cl_6 gives an emerald green color, becoming red in adding NH_3 or caustic alkali, and violet on adding sodium carbonate. It reduces ammoniacal silver nitrate solution in the cold and Fehling's solution in the heat.

It precipitates lead acetate, potassium bichromate solutions and copper acetate, but not albumin. It does precipitate gelatin in concentrated solution, but the precipitate redissolves on heating.

Kolatine does not precipitate quinine salts, which shows its difference from Knox & Prescott's kolatannin, and which Goris claims is a

¹ Bulletin de la Société Chimique de France, July 20, 1908, page 814.

mixture of several tannin containing bodies, and not a pure substance. On adding a ferment, preferably an oxidase, to kolatine, this decomposes and precipitates the well-known kola-red as an amorphous red powder. This all indicates that kolatine is a body closely allied to the tannins and much resembles pyro-catechin in its reactions. It is unstable and hard to do much with in the research way. What is of moment, however, is that physiologically kolatine is the opposite of caffeine; both act on the heart and on the systolic energy of the same, but while caffeine accelerates the cardiac movements, kolatine diminishes them. This accounts for the fact that fresh kola nuts act so differently from dried or cured kola nuts, which do not contain any kolatine, and from which we obtain, hence, the full effect of the caffeine, whereas in fresh kola nuts the kolatine prevents the caffeine from producing its effect. Hence the use of fresh kola nuts and preparations of same is to be avoided, and preparations made from dried kola used in their place.

Baltimore, August, 1908.

SOME EARLY BOTANICAL AND HERB GARDENS.

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Our ancestors of several centuries ago were much more dependent on the use of medicinal herbs, in the treatment of disease, than we are, and it is therefore reasonable to presume that the earliest experiments in the cultivation of medicinal plants in North America were made in connection with the kitchen gardens of the first settlers.

While the herbs used in cooking were probably the first that were introduced, it is well known that early in the seventeenth century the cultivation of hops had been experimented with in the Jamestown Colony.

In Massachusetts the cultivation of hops is said to have been well established as early as 1667, and it is quite probable that other European plants, furnishing useful drugs, were under cultivation even before this date.

That a number of the gardens of these early settlers were quite extensive, and could well lay claim to being more than kitchen gardens, would appear from the "History of West New Jersey," by

Gabriel Thomas, published in London, in 1698. In his description of Burlington, then the "chiefest town in that countrie," Thomas says: "There are many Faire and Great Brick Houses on the outside of the town which the Gentry have built there for their Countrey Houses, besides the great and stately Palace of John Tateham, Esq., which is pleasantly situated on the North side of the Town having a very fine and delightful Garden and Orchard adjoining to it, wherein is variety of fruits, herbs, and flowers; as Roses, Tulips, July-flowers, Sun-flowers (that open and shut as the Sun rises and sets, thence taking their name), Carnations and many more; besides abundance of Medicinal Roots, Herbs, Plants and Flowers found wild in the Fields."

The same author in "The History of Pensilvania," when speaking of Philadelphia, says: "There are fine and delightful Gardens and Orchards, in most part of this Country; but Edward Shippen (who lives near the Capital City) has an Orchard and Gardens adjoining to his Great House that equalizes (if not exceeds) any I have ever seen, having a very famous and pleasant Summer House erected in the middle of his extraordinary fine and large Garden abounding with Tulips, Pinks, Carnations, Roses (of several sorts), Lillies, not to mention those that grow wild in the fields."

Quite a famous Colonial garden, although of a somewhat later period, was that connected with the house built by Charles Norris in Philadelphia, about 1750. This garden is described by the annalist of the time as "a spot of elegance and floral beauty." It was "laid out in square parterres and beds, regularly intersected by gravelled and grass walks and alleys." It appears to have been plentifully stocked with flowers, vegetables and fruits of all kinds and also contained a liberal and varied supply of medicinal herbs. Watson, in his well known "Annals of Philadelphia," says: "It was an annual concern of the ladies of the family at Norris' gardens in Philadelphia to collect, dry and lay up various herbs for medicinal purposes, to be given away to the many who called for them."

Probably the first garden in this country to be devoted largely, if not entirely, to the cultivation and study of medicinal herbs and plants was that established in connection with the colony of Mystics or Pietists on the banks of the Wissahickon, near Philadelphia.

This is generally supposed to be the garden that is referred to in the poem, Bachelors' Hall, written about 1729, by George Webb,

an apprentice, to the printing trade, of Samuel Keimer, under Benjamin Franklin.

From the available records it appears that Webb had been an Oxford student, but by some misadventure had been brought to Pennsylvania, as a bound servant, and sold to Keimer shortly before the return of Benjamin Franklin from his first visit to London.

Webb says:

"Close to the dome a garden shall be joined,
A fit employment for a studious mind,
In our vast woods, whatever simples grow,
Whose virtues none, or none but Indians, know.
Within the confines of this garden brought,
To rise with added lustre shall be taught ;
Then culled with judgement each shall yield its juice,
Saliferous balsam to the sick man's use ;
A longer date of life mankind shall boast,
And death shall mourn her ancient empire lost."

The Pictist colony itself was comprised of religious ascetics and avowed celibates who had come to America to escape persecution and petty interference with their religious beliefs and practices.

The members were, as a rule, men of more than average intelligence and learning, particularly in their day, and many of them subsequently took an important part in the religious as well as the social development of the American Colonies.

After the death of their first leader, Johannes Kelpius, a number of the then members deserted the Colony and established themselves elsewhere. Among these early deserters was Christopher Witt, an Englishman, who had come to the Colony in 1704. This gifted, though in many respects eccentric physician and naturalist was born in Wiltshire, England, in 1674. He had evidently received a good classical education, and was also well versed in the natural sciences, and appears to have been a medical practitioner of more than average ability. Christopher Witt was a most versatile individual, who, in addition to being a student, scholar, naturalist and physician, was also a mechanician, magician, astronomer, astrologer, artist and alchemist, and he is said to have been most eccentric in his habits. It is little wonder, therefore, that he was able to impress his generally more simple-minded neighbors to such a degree that he was widely known, in Germantown and vicinity, as "Der Hexenmeister," or master of the witches. His advice was generally sought and observed, though his influence may have been feared.

Witt was, however, not the only naturalist in this colony of simple-minded, superstitious and easily impressed peasants from the Palatinate, in the early decades of the eighteenth century. His neighbor to the north was Daniel Pastorius, whose memory is so elegantly preserved by Whittier in the poem, "The Pennsylvania Pilgrim." Pastorius, like Witt, appears to have been a man of considerable learning and carried on correspondence with scholars and scientists in Europe, supplying them with information and specimens of American animals and plants. Tradition has it that the gardens of these two scholars adjoined and that there existed a friendly rivalry between them to secure the greatest number of novel or interesting plant specimens.

Of Pastorius, Whittier says that his teachers

"Sought out their pupil, in this far-off nook
To query with him of climatic change
Of bird, beast, reptile in his forest range,
Of flowers and fruits and simples new and strange.
Pastorius answered all; while seed and root
Sent from his new home, grew to flower and fruit
Along the Rhine and at the Spessart's foot,
While in return, the flowers his boyhood knew
Smiled at his door, the same in form and hue,
And on his vines the Rhenish clusters grew."

Christopher Witt, however, appears to have had the larger garden, and certainly had a wider range of acquaintances. He is known to have supplied a number of European correspondents with American seeds and plants. Witt's correspondence with European scientists extended over practically the whole of the first half of the eighteenth century, and in the earlier decades, at least, was quite extensive.

Among the better known of his correspondents was Peter Collinson, a London merchant and well-known naturalist of the eighteenth century. Collinson was born January 28, 1693-4 and died August 11, 1768, in the seventy-fifth year of his age. He is known to have had an extensive correspondence with the leading naturalists of Europe, and through him Witt became known to a large number of people who were interested in botany.

Among Collinson's American correspondents was James Logan, an associate and friend of William Penn, and one of the first Governors of the Province of Pennsylvania. James Logan was also inter-

ested in the cultivation of plants, and at his magnificent country seat, Stenton, near Philadelphia, he had extensive gardens and orchards. It is probably at Stenton that he made his well-known experiments with Indian corn or maize, the report of which was published by Gronovius and republished by Collinson in English.

Through his correspondence with James Logan, Peter Collinson became acquainted with John Bartram, the first native American botanist. Bartram was born near the village of Darby, in the Province of Pennsylvania, March 23, 1699. He died at Kingsessing, near Philadelphia, September 22, 1777.

John Bartram had an early inclination to the study of physic and surgery and acquired considerable knowledge and skill in the practice of the same. Although it is not positively known that he ever regularly engaged in the practice of medicine, his name is included in "The American Medical Biography," by Dr. James Thacher, published in Boston in 1828.

From the published correspondence between Peter Collinson and John Bartram it would appear that the latter was particularly interested in medicinal plants, both indigenous as well as imported. As early as 1738 he sent a quantity of ginseng to Peter Collinson, to be forwarded to China.

Under date of February 20, 1735, Peter Collinson wrote to his "Respected Friend, John Bartram:" "I have procured from my knowing friend Peter Miller, gardner to the Physic Garden at Chelsea, belonging to the Company of Apothecaries, sixty-nine sorts of curious seeds and some others of my own collecting."

In 1739, Bartram secured the seeds of Siberian rhubarb from Peter Collinson, who in turn had obtained them from Dr. Ammann, Professor of Botany at St. Petersburg. Collinson was anxious that John Bartram give the cultivation and use of rhubarb a fair trial and wrote to him at some length regarding the cultivation of the plant. In 1770, Bartram secured through Benjamin Franklin, a quantity of the seed of "true rhubarb," which the latter had obtained from Mr. English, "Who lately received a medal from the society of arts for propagating it." In answer to some inquiry by Bartram, relating to the origin of the seed, Benjamin Franklin wrote, under date of February 10, 1773, "It may be depended on that the rhubarb is the genuine sort, but to have the root in perfection it ought not to be taken out of the ground in less than seven years."

During the Colonial period there appear to have been a number of gardens in Virginia, of more than local reputation. In the autumn of 1737, John Bartram made an extensive tour through Maryland and Virginia, in the course of which he visited a number of these gardens. His subsequent report of this trip, to Peter Collinson, does not appear to have been sufficiently complete for his correspondent, who inquires: "I am informed my friend Custis is a very curious man; pray what didst thou see new in his garden? But I am told Colonel Byrd has the best garden in Virginia, and a pretty green house, well furnished with orange trees."

During this trip John Bartram visited the garden of John Clayton, an eminent botanist of Virginia and also a friend and correspondent of Peter Collinson. Clayton was born at Fulham, in the county of Kent, England, about 1685, and came to America with his father in 1705. He died in Virginia, December 15, 1773, in the eighty-eighth year of his age. In 1739, Gronovius, Professor of Botany at Leyden, published a "*Flora Virginica*," contributed by John Clayton. His name is also well known to all plant lovers through being associated with the well-known and widely admired "*Claytonia Virginica*."

Clayton appears to have had quite an extensive garden and had numerous correspondents in Europe, as well as in the Northern Colonies, who supplied him with new and interesting plants and seeds in exchange for the many and varied specimens that he was able to furnish them.

Another garden, of the Colonial period, that attracted considerable attention was that owned by Dr. Alexander Garden, at Charleston, S. C. Dr. Garden was a native of Scotland and a graduate of Edinburgh. He was a member of the Royal Society and devoted much time to the study of scientific subjects and to the cultivation of interesting and rare plants. In 1754 he wrote a description of a new plant, "*Gardenia*," and in 1764 published an account of the *Spigelia Marylandica*, or Carolina pink-root.

During the American Revolution Dr. Garden remained loyal to the British Government, in consequence whereof he suffered, not alone the loss of patients and friends, but also considerable loss of property.

Garden returned to England, about the close of the war, and lived for some time in London, where he died, April 15, 1791, in the sixty-second year of his age.

Another quite extensive and generally well-known garden, dating back to the Colonial period, was that of Humphrey Marshall, a cousin of John Bartram, at Marshallton, Pa.

Humphrey Marshall was born in West Bradford, Chester County, Pa., October 10, 1725, and died November 5, 1801. He was the eighth child of Abraham and Mary Hunt Marshall. At an early age he was apprenticed to a stone mason, which vocation he followed for a number of years. The garden at Marshallton was not founded until 1773, from which time Marshall appears to have devoted all of his time to the study of botany. In 1780 he began to prepare an account of the forest trees and shrubs of North America. This is said to have been the first truly indigenous botanical book published in this country and was the means of attracting to Marshallton a number of widely known botanists and scientists.

Frederick Pursh, in the preface to his "North American Flora," says: "I next visited the old-established gardens of Mr. Marshall, author of the small treatise on the forest trees of North America. This gentleman, though then far advanced in years, and deprived of his eyesight, conducted me personally through his collection of interesting trees and shrubs, pointing out many which were then new to me, which strongly proved his attachment and application to the science in former years, when his vigor of mind and eyesight were in full power."

Although Humphrey Marshall was primarily interested in trees and shrubs, his correspondence evidences the fact that he also experimented quite extensively with medicinal plants.

Dr. Thomas Bond, who appears to have had an extensive correspondence with French botanists, with whom he frequently exchanged plants and seeds, wrote to Humphrey Marshall, under date of August 24, 1781: "The opium you sent is pure and of good quality; I hope you will take care of the seed." Indicating that Marshall was among the first, in this country, to make satisfactory experiments in the growing of the opium poppy and the collection of opium.

Under date of October 21, 1787, Dr. Caspar Wistar, another noted medical practitioner of Philadelphia, wrote to Humphrey Marshall asking him for some leaves of foxglove, also some of the seed.

Withering's observations on the remarkable properties of digitalis

were, as yet, comparatively new, and the drug was attracting considerable attention abroad as a new remedy.

Letters from William Hamilton to Humphrey Marshall also contain requests for roots and seeds of medicinal plants. In one of these letters Hamilton asks for such well-known medicinal plants as *Polygala Senega*, *Spigelia Marylandica*, *calycanthus* and *podophyllum*.

The garden that had been established by William Hamilton, who was a retired Philadelphia merchant, was one of considerable pretension. It was connected with his elegant residence, the Woodlands, on the Schuylkill, near Philadelphia. This garden was, in later years, conducted by botanists of more than local reputation. The first of these, John Lyons, was a Scotchman by birth, and came to America about the beginning of the nineteenth century. While in charge of the garden at the Woodlands, Lyons had an extensive correspondence with botanists and gardeners in England and was instrumental in introducing a number of American plants into foreign gardens. Lyons died at Asheville, N. C., in 1818.

His successor, at the Woodlands, was Frederick Pursh, of German origin but born at Tobolsk, in Siberia, in 1774. He was educated at Dresden and came to America in 1799.

In 1807 Pursh was placed in charge of the Elgin Botanical Gardens in New York. He died in Montreal, Canada, June 11, 1820. His best known work was that done in connection with the collection of plants gathered by the Lewis and Clark expedition of 1804-1806, which forms a large and important portion of his description of the plants of North America, published in 1814.

Dr. Cadwalader Colden, one of the more prominent medical practitioners of the Colonial period, also devoted much of his leisure to the study of botany. He had quite an extensive correspondence on botanical subjects with the leading botanists of Europe.

Dr. Colden was born in Duncce, Scotland, February 17, 1688. He graduated from the academic department of the University of Edinburgh in 1705, and then studied medicine. He came to Philadelphia in 1710, and established himself in the practice of his profession, but returned to England in 1715, where he married a young lady of Scotch parentage, by the name of Christie, with whom he again returned to America in 1716.

About 1718 Dr. Colden removed from Philadelphia to New York,

where he at first practiced his profession, but subsequently occupied sundry public offices. He was appointed Lieutenant-Governor of New York in 1761, and continued in this capacity to the time of his death, September 28, 1776, in the sixty-ninth year of his age.

For many years Dr. Colden took an active interest in botany and appears to have devoted considerable time to the gathering and the cultivation of American plants. He had an extensive correspondence with a number of the leading botanists of Europe as well as America. He had a magnificent country seat at Coldenham on the Hudson, where many of his botanical experiments and observations were made. In his botanical studies he was ably assisted by his daughter, Jane Colden, who was also greatly interested in botany and was probably one of the first women in this country to take an active interest in the study of plants.

One other woman of the Colonial period, who deserves recognition for the work that she did in connection with botany, was Martha Logan, an early correspondent and friend of John Bartram. She was a daughter of Robert Daniel, of South Carolina, and married George Logan, in her fifteenth year. She died in 1779, in her seventy-seventh year.

Gotthilf Heinrich Ernst Mühlenberg, a son of Pastor Heinrich Melchior Mühlenberg, and a brother of the fighting pastor, General Peter Mühlenberg, was born in New Providence, Montgomery County, Pa., November 17, 1753, and died in Lancaster, Pa., on May 23, 1815.

Mühlenberg studied at Halle, and was one of the best informed and most systematic botanists of his day. He had a widespread correspondence with other botanists, particularly in Germany.

At an early date Mühlenberg devoted much of his spare time to the study of the medicinal properties of indigenous medicinal plants. It is said that he furnished Dr. Shöpf with numerous notes on the medicinal properties of American plants, which the latter used in his work on the American *Materia Medica*, but omitted to mention his source of information.

Mühlenberg appears to have had quite an extensive botanical library, and also a garden, for in a letter to his friend William Bartram he says: "May I ever expect to see you at my house? I have Edwards and Catesby, Jacquin, Gaertner deFructibus, and several other valuable works; likewise Wangenheim on the forest

trees of America, with figures which I would like to compare with you. My Herbarium vivum is pretty large, and would alone take a day to look attentively through."

The services of Mühlenberg have been recognized by several botanists. Schreiber, a close friend and a frequent correspondent of Mühlenberg's, gave his name to a genus of grasses while, Torrey and Gray have perpetuated it in connection with a goldenrod, *Solidago Mühlenbergii*. Barratt gave his name to a willow, *Salix Mühlenbergii*, and Grisebach to a centaury, *Erythræa Mühlenbergii*.

An interesting, though unpretentious, garden was that connected with the Moravian boys' school at Nazareth, Pa. This garden, or pleasure ground as it was sometimes called, was commenced shortly after the founding of the school, in 1759. It appears to have been cultivated by the teachers connected with the institution, and is generally recognized as having had considerable influence on the development of interest in botany and natural history in this country. After an existence of nearly a century it was allowed to fall into disuse, and at the present time there is barely a vestige of its original character still existing.

Among the earlier American botanists connected with this school were the Rev. Christian Denke and the Rev. Samuel Gottlieb Kramsch. The latter particularly was an ardent and ever active botanist and is known to have had correspondence with botanists at home as well as abroad. He was born in Rudolstadt, in Silesia, September 7, 1756, and came to America at an early age. He served for some time as a teacher at Nazareth Hall, Nazareth, Pa., and was subsequently transferred to Salem, N. C., where he died, February 2, 1824. Among other well known botanists, who have been connected with this school and garden at Nazareth, probably the best known was the Rev. Lewis D. deSchweinitz, whose work in mycology is so well and so favorably known at home as well as abroad.

DeSchweinitz was a student and subsequently a teacher at Nazareth Hall.

Another garden, more or less closely connected with the Moravian Church, was the one at Bethlehem, Pa. This garden appears to have been devoted, largely if not entirely, to the cultivation of medicinal herbs and plants. It was probably originated by the Rev. John Andrew Hübner and Dr. J. Matthew Otto. Dr. Schöpf in his "Inci-

dents of Travel" (Bayreuth, 1788) says that he met the Rev. John Andrew Hübner on his visit to Bethlehem, after the Revolutionary War. He also met Dr. Otto, who, he says, attended the community in the threefold capacity of physician, surgeon and apothecary. To Dr. Otto, Schöpf was indebted for a variety of information concerning the medicinal uses of indigenous drugs. This information was probably collected by Otto from the various Moravian missionaries, who, as is well known, had an extensive and intimate knowledge of the habits and practices of the early aborigines.

The herb garden at Bethlehem was, for a number of years, in the direct care of Dr. Otto. He was succeeded, in 1790, by Dr. E. Freytag, who continued in charge until 1836, when he was succeeded by Mr. Simon Rau, who later purchased the apothecary business from the Moravian Church, and conducted it as a private venture. Exactly when the herb garden was discontinued could not be ascertained, but it is quite probable that it was coincident with the transfer of the apothecary shop to private interests.

André Michaux, a noted French botanist, arrived in New York in October, 1785, his object being to collect indigenous plants and seeds for the several botanical gardens in France.

He is said to have established a botanical garden in Bergen County, N. J., some seven or eight miles from New York, for the purpose of more closely studying the several American plants and also to serve as a nursery from which to supply botanical specimens, seeds and a variety of botanical information to larger gardens in France. Michaux traveled quite extensively and is said to have covered the entire territory from Hudson's Bay, in British North America, to the Indian River, in Florida, and from the Bahama Islands to the banks of the Mississippi River. From his original garden, near New York, he made short trips into New Jersey, Pennsylvania and Maryland, and as a direct result of these trips sent to France twelve boxes of seeds and five thousand seedling trees.

Michaux visited South Carolina about 1787, and found that Charleston would likely prove to be a more suitable place for his nurseries. He subsequently established quite an extensive garden in or near that city, making it his headquarters for the remainder of his stay in this country. Darlington, in his memoirs of John Bartram, refers to a botanic garden existing in Charleston about 1807, and it is not

improbable that this may have been the identical garden established by Michaux twenty years before.

In 1801, David Hosack, at that time Professor of Botany in Columbia University, purchased a tract of twenty acres of land in what is now a desirable and fashionable portion of New York City. This tract of land was, at that time, about three and one-half miles out of the city, between Bloomingdale and Kingsbridge, on the middle road. The whole tract of land was intended by Professor Hosack for a botanical garden, the prime object of which was to be the collection and cultivation of native plants of this country, especially such as possess medicinal properties or are otherwise useful. Professor Hosack, at his own expense, furnished the garden with a variety of indigenous and exotic plants. In 1805 there were in actual cultivation nearly 1,500 species of plants, largely, if not entirely, of American origin. The following year Professor Hosack published a catalogue of the plants contained in the botanic garden at Elgin, in the vicinity of New York. This catalogue, now extremely rare, contains an extensive list of the plants then under cultivation, and was intended as a guide for students and others visiting the gardens.

During the session of the New York State Legislature, in 1810, an act was passed for the purchase of what had become known as the Elgin Botanical Garden, the care of which was to be placed in the hands of the Regents of the University.

Some years later the garden was committed to the care of the Trustees of the College of Physicians and Surgeons of New York, to be kept by them "in a state of preservation and in a condition fit for all medical purposes."

With the deflection of the fealty of Professor Hosack and others from the College of Physicians and Surgeons and the inauguration in New York City, of a medical school under the patronage of Rutgers College, New Jersey, it is probable that the custodians of the gardens did not feel that they were obliged to maintain an establishment which did not bring them any direct rewards and for the maintenance of which they were annually expending a considerable sum of money which they could ill afford.

The garden was gradually abandoned, fell into decay and was finally sold for the benefit of Columbia College.

The still existing garden at Harvard was founded in 1805 by Prof. W. D. Peck, the then newly elected Professor of Natural His-

tory. About 1822 the Harvard Botanical Garden was placed in charge of Thomas Nuttall, an Englishman by birth, who did much to develop a widespread interest in American botany.

Thomas Nuttall, born in England in 1786, came to America, when about twenty-two years of age. He had been apprenticed to a printer and during his sojourn in Philadelphia worked at that trade occasionally for a livelihood. It is said that he himself set the greater part of the type for his book, "The Genera of North American Plants, and a Catalogue of the Species to the year 1817," which was published in 1818. Nuttall lectured on botany in 1822, and at the end of that year was appointed curator of the botanic garden at Harvard, where he remained for upwards of ten years.

Nuttall subsequently made an extensive trip through the Western country and devoted an extended stay in Philadelphia to a critical study of his rich collection of indigenous plants. He sailed for England in 1841 and died September 10, 1859.

After the accession of Asa Gray as Professor of Botany at Harvard, the botanical garden rapidly developed, and, owing perhaps to the scientific attainments of the director, even attracted considerable attention abroad.

What is known to have been strictly an herb garden was in existence for many years, in Philadelphia, in connection with the Friends' Almshouse. This institution, made immortal by Longfellow's "Evangeline," was founded in the early decades of the eighteenth century, on a plot of ground that was left to members of the Society of Friends by John Martin, a well-to-do tailor, who died without immediate family. The institution consisted of a number of cottages; the first of these was erected in 1713, and the large front building, sometimes called the Quaker Nunnery, was built in 1729. The institution had an uninterrupted existence of more than a century and has frequently been referred to in song and in story. For many decades the grounds surrounding the cottages were largely, if not entirely, devoted to the cultivation of medicinal herbs. These herbs acquired considerable reputation and for many years were eagerly sought for as being the finest and most desirable that were to be had.

During the early part of the nineteenth century the cultivation of medicinal herbs, in a commercial way, appears to have attracted considerable attention. This is particularly evidenced by the space that is devoted to the directions for cultivating medicinal plants, in

books on gardening and agriculture, at that time. Bernard McMahon, in his "American Gardener's Calendar," devoted much attention and an unusual amount of space to the consideration of the most advantageous methods of caring for and cultivating medicinal plants. He enumerates upwards of sixty different plants that can be grown, in temperate climates, and in addition gives detailed as well as general directions for collecting, drying and preserving all kinds of medicinal herbs, seeds, barks and roots.

McMahon was born in Ireland, about 1775, he arrived in Philadelphia in 1796, and about 1809 founded a botanic garden which he named Upsal. During its existence this garden was usually enumerated among the interesting sights of Philadelphia, and is frequently mentioned by the writers of that period. McMahon's varied knowledge of botany and gardening won for him the friendship of Thomas Jefferson and of others who were interested in botany and the natural sciences. He died about 1830.

So far as known the most extensive growers of medicinal plants in this country, at any time, were the Shakers. They began the cultivation of medicinal plants, at the parent settlement at Mount Lebanon, N. Y., as early as 1800, and soon established a large and lucrative business in this line. The cultivation of medicinal plants was subsequently taken up at several of the other Shaker settlements, particularly at Union Village, O., and continued, with varied success, for a number of years.

At Mount Lebanon, the parent settlement, located near New Lebanon, in Columbia County, N. Y., the annual output of medicinal roots, barks and herbs averaged upwards of 40,000 pounds.

The Shakers were the first to adopt the now widely used compressed package, for their medicinal herbs, and they are no doubt to be credited with at least suggesting the now all too popular compressed pill or tablet. About 1830, or 1832, at the suggestion of Dr. Whitlaw, the Shakers began the manufacture of medicinal extracts. This portion of their business also progressed rapidly and in this particular line they are said to have reached an annual output of upwards of 23,000 pounds.

The large herb house of the Shakers was destroyed by fire in 1875, and since that time they have confined their business, in the line of medicinal products, almost entirely to a limited number of

extracts, made exclusively for two or three large manufacturers of proprietary remedies.

The success of the Shakers, with medicinal herbs, induced others to venture into the same field. At New Lebanon, N. Y., in the immediate vicinity of the Shaker community, Tilden & Co. had, at one time, a tract of upwards of forty acres planted in medicinal herbs. In the *AMERICAN JOURNAL OF PHARMACY*, for 1851, 1852 and 1855, will be found several interesting articles, written by Prof. William Procter, Jr., on the "Herb Gardens of the Lebanon Valley." These articles record Professor Procter's visit to this section, and in them he gives quite an exhaustive account of the extent and variety of herb culture, as carried on by Tilden & Co. and the Shaker community.

From these articles it would appear that, at that time, upwards of forty varieties of medicinal herbs were being cultivated in Columbia County, N. Y., and that upwards of 100 acres were annually planted in medicinal herbs.

A recent communication from the successors of Tilden & Co. states that they discontinued the cultivation of medicinal herbs some fifteen or eighteen years ago and were not at present engaged in this particular line.

Among medicinal plants that have received more special attention in this country, the cultivation of hops is the most widespread. Hundreds if not thousands of acres in the States of New York, Washington, Oregon and California are annually devoted to this particular crop. It should be added, of course, that but an infinitesimally small amount of the total annual yield is used in medicine. Nevertheless, the hop is, strictly speaking, a medicinal plant.

The cultivation of opium has been tried at various times and under differing circumstances. During the Revolutionary War, and again during the War of 1812, when supplies of foreign drugs were scarce and hard to get, considerable opium was produced in this country. The same is true of the Southern States, where, during the War of the Rebellion, a considerable amount of excellent opium was produced. That the production of opium has not developed as a permanent industry is entirely due to the relatively high cost of labor.

The cultivation of peppermint, largely for the essential oil, was introduced into Wayne County, N. Y., about 1816. For many

years it was confined almost exclusively to this one section of New York State, and Wayne County oil of peppermint was long considered to be synonymous for all of the oil of peppermint produced in this country. The cultivation of the peppermint plant was subsequently introduced into Ohio, and about 1835 the first experiments in peppermint culture, on a large scale, were made in Michigan. The latter State soon led in the quantity, if not the quality, of its output and is even to-day considered to be the chief source of American oil of peppermint.

Of the more strictly native plants the cultivation of ginseng early attracted attention. Experiments in the cultivation of ginseng are known to have been conducted by American as well as foreign botanists and gardeners, and there is direct evidence that John Bartram, Peter Collinson and D. Fothergill all devoted considerable time and study to the growth of ginseng.

In Ewell's Medical Companion there is a record that a Dr. Thornton is said to have been particularly successful in the cultivation of ginseng on a farm near Washington, D. C., as early as 1815.

The particular interest that attaches itself to this plant is of course the relatively high price, and this with the perhaps slightly overdrawn advertisements of modern ginseng growers is no doubt the direct cause of the present-day revival of interest in this evidently inert drug.

The general revival of interest in the cultivation of medicinal plants is, however, due to other causes, largely, at least, economic, and the direct outcome of the ever widening area of land that is being brought under cultivation, the disappearance of our forests and the accompanying difficulty of securing the native medicinal plants that are largely restricted to wooded areas.

The scarcity of drugs such as hydrastis, senega, and serpentaria, has resulted in an accompanying increase in price depending on the popularity and use of these drugs.

The increase in the price of these drugs and their growing scarcity has attracted the attention of botanists and drug brokers, and largely through the frequent inquiries that have been made regarding future supplies of these drugs the Agricultural Department has been induced to take up the study of the several plants with a view of leading up to the cultivation of them on a commercial scale.

SOME MINOR SUGGESTIONS FOR IMPROVEMENTS IN
THE UNITED STATES PHARMACOPŒIA.¹

BY GEORGE M. BERINGER.

The time is rapidly approaching when the convention for the Ninth Revision of the United States Pharmacopœia must be held. The eighth revision has been the official standard since September 1, 1905, and it is believed to have been more generally studied and criticised than any one of the previous revisions. A volume of its size and complex composition cannot be expected to be perfect or free either of errors or criticism.

The present revision gives every evidence of the high ideal of the Committee of Revision, and we have their official assurance that "communications containing suggestions for improvements in the Pharmacopœia will be thankfully received, carefully considered, and utilized as far as possible."

It is certainly fair to assume that every one of the thousands of intelligent users of the Pharmacopœia, including the pharmacists of New Jersey, has noted some omissions, errors or defects in formulas, or has encountered some difficulty in following official directions or has worked out some improvements. These should all be presented to the pharmaceutical societies, discussed and permanently recorded and published so as to be available and of assistance to the Committee of Revision in their most laudable desire to make the next revision a still more satisfactory standard and as near perfect as possible.

The present communication is offered with the hope that the criticisms and suggestions ventured will create discussion, and if any of the suggestions are available that these will receive consideration and be utilized in the next revision.

CRUDE DRUGS.

Drugs of Vegetable Origin.—Definitions and Descriptions.—The value of the Pharmacopœia as a text book as well as an accurate legal authority must not be lost sight of, and also the very uncertain knowledge of the sources of the drugs too frequently possessed and exhibited alike by prescriber and dispenser. This leads to a sugges-

¹ Presented to the New Jersey Pharmaceutical Association at the thirty-eighth annual meeting, Atlantic City, June 5, 1908.

tion, namely, that with each definition there be included a terse statement descriptive of the source and habitat. At first thought this may appear as if it would greatly extend the size of the book, but a few examples will show how in a very condensed form a mass of valuable information can be thus introduced. Illustrating this suggestion the following titles and descriptions are submitted:

Arnica.—The dried flower heads of *Arnica montana* Linné (Fam. *Compositæ*), a small plant growing in Central Europe.

Balsamum Tolutanum.—A balsam obtained by incising the trunk of the tree *Toluifera Balsamum* Linné (Fam. *Leguminosæ*) indigenous to the northern countries of South America.

Benzoinum.—A balsamic resin obtained as an exudation on the trunk of the tree, produced by hacking the bark of *Styrax Benzoin* Dryander and other species of *Stryax* indigenous to Java, Sumatra and Siam.

Buchu.—The dried leaves of *Barosma betulina* (Thunberg) Bartling and Wendland (Fam. *Rutaceæ*) a shrub indigenous to Cape Colony and gathered while the plant is flowering and fruiting.

Pimenta.—The dried, full grown but unripe fruit of *Pimenta officinalis* Lindley (Fam. *Myrtaceæ*), a tree growing in the West Indies.

Podophyllum.—The dried rhizome of *Podophyllum peltatum* Linné (Fam. *Berberidaceæ*), a perennial herb growing in the United States and Canada.

If this suggestion be adopted the danger of customers being advised that "Black Pepper is the fruit of a tree growing in Russia" or that "Eucalyptus is the leaf of a vine from North America" would be minimized.

Aloes.—The single title Aloes as now officially used is broadened so as to cover three distinct commercial varieties—Barbadoes Aloes Curacao Aloes and Socotrine Aloes. Either of these or any mixture of these is U.S.P. Aloes. The wisdom of this change is doubtful, especially as the official description and tests given are not sufficiently definite or discriminating. When the Pharmacopœia adopts a title for more than one commercial variety or source of a drug, the official descriptions of each variety should be given under that title. This should be an established rule. Under *Ipecacuanha* the Pharmacopœia does thus give descriptions of Rio Ipecac and of Carthagena Ipecac and under *Pilocarpus* of *Pilocarpus Jaborandi* and of *Pilocarpus microphyllus* and under *Serpentaria* of Virginia

Serpentaria and of Texas *Serpentaria*; but under *Aloes* only one general description is given and that one rather meagre. There should certainly be a concise description of each commercial variety of aloes, and as a test distinguishing Curacao Aloes from Socotrine, and the absence of this variety as an adulterant in the latter the so-called cupraloin reaction might be given. This test is stated in the British Pharmaceutical Codex as follows: "If 10 c.c. of an aqueous solution of aloes 1 to 1000 be mixed with 1 c.c. of a 5 per cent. solution of copper sulphate and 1 c.c. of saturated solution of sodium chloride and a few drops of diluted hydrocyanic acid added, a fine, deep, persistent claret color is rapidly developed due to isobarbaloin contained only in Curacao Aloes.

Veratrum is another instance where the present revision in the opinion of the writer has erred in placing two drugs entering commerce from two different hemispheres under one title. While recognizing that the American Hellebore and the European or White Hellebore are yielded by two distinct species of *Veratrum*, the official title and description cover both and the use of either or mixture of the two is thus sanctioned. This is particularly unfortunate, as it is pretty certain that the chemical constituents are not identical and many able physicians recognize a difference in the therapeutic action. As we have no assay process given for *Veratrum* or its preparations the poorest specimen of white hellebore imported for use as an insecticide can be substituted for the best grade of the American drug or admixed therewith. If the two plants grew together and the drugs were collected mixed as in the case of *Viburnum Prunifolium* where *V. prunifolium* L. and *V. Lentago* L. are thus collected, there would be some justification for such indefiniteness in the U.S.P. But in the case of *Veratrum* this does not occur.

Apocynum.—The official definition of this drug is "The dried rhizome of *Apocynum cannabinum* Linné, or of closely allied species of *Apocynum* (Fam. *Apocynaceæ*)." This is entirely too broad and would admit the common adulterant the rhizome of *Apocynum androsaemifolium*, which is a closely allied species. The definition should be restricted to the rhizome of *Apocynum cannabinum*, or to such additional species or varieties or hybrids as can be named.

Cascara Sagrada.—The efforts to popularize the official titles *Rhamnus Purshiana* and *Fluidextractum Rhamni Purshianæ* that have been made through two revisions of our Pharmacopœia have

not proven successful, and as physicians persist in prescribing these under the name of *Cascara Sagrada*, there appears to be no reason why our Pharmacopœia should not follow the example of some of the other national pharmacopœias and Latinize the title of *Cascara*. If the Pharmacopœia is to be consistent throughout and eliminate as an official title *Cascara Sagrada*, then other titles such as *Cusso* should likewise be changed to the botanical name of the plant source.

On the Admission of a Drug Without Introducing a Preparation Thereof.—A rule should be established that a drug that is not administered either in its natural state or pulverized or in the form of an infusion or decoction should not be admitted into the Pharmacopœia without a formula for the preparations in which it is commonly exhibited. This would have either excluded *Sabal* or made the inclusion of formulas for fluidextract and tincture necessary. *Gossypii Cortex* is commonly administered either as fluidextract or as solid extract, yet no preparation is given.

Staphisagria is rarely used as a fluid extract but is quite commonly used as a tincture, yet a formula for the former is given and the latter omitted.

Drugs of Animal Origin.—While the official definitions of the drugs of vegetable origin very generally give the origin and family according to the latest botanical classification, the reverse appears when we examine the definitions given for drugs of animal origin. Here we note that the zoological classifications are generally omitted. Uniformity of style and the same careful method of description should characterize the treatment of the drugs derived from both kingdoms.

Cera Flava is described as "A solid substance prepared from the honeycomb of the bee, *Apis Mellifera* Linné." A more correct definition would be "A natural secretion forming the wall of the honeycomb of the hive bee *Apis Mellifera* Linné (Order *Hymenoptera*) purified, after removing the honey, by melting with water, separating and straining."

Cantharis.—This should be accompanied by an assay process, and the percentage of active principle fixed within reasonable limits attainable in commerce.

Alcohol Content of Official Preparations.—The National Food and Drugs Act and many of the State laws recently enacted on the sub-

ject of food and drugs require the alcohol content to be stated on the label, even of official preparations. This necessitates that the pharmacists determine the alcohol content in each lot of preparation made, entailing in the aggregate an enormous amount of useless labor. It is recommended that the Committee of Revision have determinations made of alcohol content of official preparations and in each state the "average alcohol" contained in the finished product. As an official statement this would become part of the legal requirement and save the pharmacist an enormous amount of time.

Alkaloidal Assays.—The alkaloidal assay processes need revision, but only after critical review and research, and these reviews and investigations should be made by competent experts not associated with the present accepted methods. The processes for colchicum and conium are far from satisfactory and must be improved. In the assay of aconite and preparations of same, ether is directed as the solvent, although it is well known that chloroform is the better solvent for the alkaloids of aconite, and the writer suggests that in place of ether, chloroform be substituted or a mixture of chloroform and ether as directed in the German Pharmacopœia.

The writer will, at the present time, merely call attention to several basic errors that pervade these official assay processes. The one is illustrated in the direction for assaying extract of belladonna, which advises the introduction of 5 grammes of the extract into a small beaker and its solution in a mixture consisting of alcohol 5 c.c., distilled water 10 c.c., ammonia water 2 c.c., and chloroform 20 c.c. The attempt to dissolve the extract in the beaker in these immiscible fluids is impractical and destructive of accuracy. The better method is to mix the alcohol and water and dissolve the extract in a portion of this mixture and transfer to a separator, reserving a small portion of this mixture to rinse the beaker. The chloroform should then be added to the separator and then the ammonia. By this method of manipulation, the alkaloid is subjected to the solvent action of the chloroform as soon as liberated and the loss of solvent and likewise of active ingredients is thus prevented.

Another error is the use of N/10 sulphuric acid V. S. standardized with methylene orange as an indicator and N/50 potassium hydroxide V. S. standardized with phenolphthalein as an indicator and with these a final titration of the alkaloid with cochineal T. S. as an indicator. N/50 volumetric solutions of both acid and alkali

should be directed to be used that had been previously titrated against each other, using the same indicator as used in the final titration of the alkaloid, thus greatly reducing the danger of experimental error.

CHEMICALS.

Cerium Oxalate.—This title is officially and now legally applied to a varying "mixture of the oxalates of cerium, didymium, and lanthanum and other rare earths of this group." The title should be modified so as to show that it is the so-called "medicinal, commercial, or admixed" salts that is official and not the pure, definite salt.

Safrol.—This is officially defined as "the methyl ether of allylpyrocatechol, found in oil of sassafras, camphor oil, and other volatile oils, purified, if necessary, by repeated chilling and crystallization." This definition leaves out an important statement, namely, the preparation which must precede the purification. In the official statement the following should be added before the word purified, "separated by fractional distillation."

Scopolamine Hydrobromide.—This is defined as "obtained from plants of the *Solanaceæ* and chemically identical with Hyoscyne hydrobromide." No tests are given, and if hyoscyne and scopolamine are identical and the article is commonly sold under either name, then the U.S.P. should certainly eliminate one title and make in the text a statement of the identity of these two commercial alkaloidal salts. The writer would recommend that the official title retained be *Scopolaminæ Hydrobromidum* as indicating the most common source, *Scopola*, and being a distinctive name, serving to prevent confusion and possibly dangerous error from the close similarity of hyoscyne with hyoscyamine.

Thymol Iodide.—The writer will once more direct attention to the fact that the official definition as "dithymol diiodide" is incorrect despite all the text-book theories. The iodides of thymol supplied and used are mixtures of several iodine substitution compounds of thymol, and a thorough research to settle their composition should authoritatively be undertaken before the next revision.

PHARMACEUTICAL PREPARATIONS.

Ceratum Cantharidis.—The official formula directs that the powdered cantharides be macerated with 150 grammes liquid petrolatum

in a warm place for forty-eight hours. While the petrolatum may soften the powdered beetles, it is but a poor solvent for the active principle and the combined cantharidin is not liberated.

A more effective preparation is secured by macerating the cantharides with 20 c.c. acetic acid for twenty-four hours, prior to adding it to the resin, yellow wax, lard and liquid petrolatum, previously melted together and strained through muslin. The small amount of acetic acid remaining in the finished product is no detriment but rather an aid to its action, and the increase in weight therefrom hardly counterbalances the loss sustained in straining the melted base.

Extracts.—The method of preparing the solid extracts by evaporation of the fluid extracts, which is officially directed in many of the extracts, does not appeal to the manufacturer, as it is wasteful of alcohol, and to the retailer the cost would be greatly in excess of the purchase price of a satisfactory article.

This method likewise exposes the active constituent of the drug to the prolonged heating of both the original preparation of fluid-extract and the evaporation directed in the preparation of the solid extract. I would recommend that this method be discontinued except as an emergency method by the pharmacist and the Pharmacopœia direct in each formula for solid extract the direct extraction with the menstruum.

With powdered extracts the writer has experienced considerable difficulty from caking and solidifying, and believes that this has also been a serious annoyance to the larger manufacturers. This appears to occur mostly in the extracts, such as extract of *nux vomica*, in which milk sugar is specifically directed as the diluent. I believe that this can be corrected by substituting for the milk sugar as a diluent the finely powdered and dry drug or the dried and finely powdered marc from the process. In the introductory notes on page 52 of the Pharmacopœia "permission is given to employ the dried and powdered marc from the percolation of the same drug as a diluent in place of powdered peeled Russian licorice root," and it is recommended that this permission be extended also to all powdered extracts in which milk sugar is directed.

While the Pharmacopœia does in this revision recognize a number of powdered extracts the list should be extended by the introduction of powdered extracts of belladonna leaves, *colchicum corm*, *hyoscyamus* and others that are commonly used in that form.

Fluidextracts.—In the formulas for fluidextracts much useless waste of space can be saved by the adoption of general processes and the direction to use alcohol of a given percentage.

Fluidextract of buchu should be made with alcohol as a menstruum, which yields a preparation in which the oil and resin does not separate as in the present official formula, with a menstruum of alcohol 3, water 1.

Fluidextract of Cascara Sagrada is best made with an aqueous menstruum and the concentrated percolate preserved by the addition of 25 per cent. of alcohol.

Fluidextract of Squill does not fully represent the drug, as no attempt is made to secure complete extraction.

Fluidextract of Glycyrrhiza is not satisfactory and the writer has proposed an improved formula (see Proceedings of New Jersey Pharmaceutical Association, 1905, fol. 75) the product of which keeps well as shown by samples on hand of portions of a lot made more than three years ago.

Fluidextract of Senna.—The preliminary percolation of the drug with alcohol is expensive as it is very wasteful of alcohol, and is likewise of doubtful utility. The griping tendency of senna can be more economically and effectively overcome by the addition of a small amount of a carminative, such as the oils of coriander or fennel.

Liquor Cresolis Compositus.—The drug journals have contained numerous articles expressing difficulty with this preparation. This is an example of a good formula spoiled by faulty directions for manipulation. The official directions for soft soap very properly direct that the linseed oil be saponified by the potassium hydroxide in solution with the aid of heat and the addition of a small quantity of alcohol. Yet in compound solution of cresol, which is only a fifty per cent. solution of cresol and soft soap, it is directed that the linseed oil shall be saponified cold and without any alcohol. If the official method for making soft soap be carried out in the preparation of the compound solution of cresol, there will be no trouble in obtaining a satisfactory product. It is noteworthy that the British Pharmaceutical Codex has exactly followed this suggestion in copying the formula.

Compound Syrup of Sarsaparilla would be improved by increasing the quantity of essential oils of sassafras, anise and gaultheria from

0.2 c.c. to 0.5 c.c. The dilution of the mixed fluidextracts and oils with water and filtration and subsequent exposure to heat as directed, likewise occasions loss of flavoring and the product has no advantage over that produced by the customary practice of adding the mixed fluidextracts and essential oils to syrup. The Pharmacopœia could, with no loss of authority, be made in this to conform to the very general custom. As "oil of gaultheria" is very rarely obtainable, oil of betula should be officially substituted.

Tincture of Cantharides.—Here the addition of 10 c.c. glacial acetic acid to the alcohol directed for maceration is recommended so that the combined cantharidin will be liberated and the preparation represent the full activity of the drug.

Compound Tincture of Gentian.—The menstruum adopted, 6 of alcohol to 4 of water, it was hoped would yield a stable product, but experience shows that the present official preparation precipitates quite as much as that of the previous revision.

Tincture of Strophanthus.—The increase in the drug strength of this preparation from 5 to 10 per cent. has not resulted in doubling the strength of the tincture, as the drug is never exhausted by the menstruum. It is to be noted that this movement of the U.S.P. increasing the strength of this tincture is contrary to the British Pharmacopœia, where the 5 per cent. tincture of strophanthus official in the 1885 edition was reduced in the later revision to $2\frac{1}{2}$ per cent.

The official formula, by using a menstruum composed of 650 c.c. alcohol and 350 c.c. water, aims to leave the disagreeable, odorous and nauseous fat in the marc, but this is not successfully accomplished, and I would strongly urge the preliminary extraction of the fat and oils from the powdered drug with purified benzin and then drying before proceeding to extract for tincture.

COMPARISON OF EXTRACTS OF VANILLA AND LEMON AS SOLD BY GROCERS AND THOSE PREPARED BY THE U.S.P. FORMULAS.¹

BY M. R. DICKSON.

There is perhaps not another class of pharmaceuticals more widely known, used, and distributed, than the flavoring extracts, particularly

¹ *Bulletin of the State University of Iowa*, May, 1908, p. 22.

those of lemon and vanilla, the most popular of which is vanilla. All classes of people, be they the most humble or the most high, the most democratic or the most aristocratic, poor or rich, all make constant use of these articles; and yet for all this, where is there an article, the true composition of which is less known or even given a thought by the majority of consumers? For this reason there is unlimited opportunity for those, keen at deceit, to practice their fraud and deception by putting out an article which is not only cheap in the extreme, but is far from being up to the standard of the U.S.P. and conducive to good health.

This is done not only by using cheap grades of material in the manufacture of the article, but by gross adulteration with substances which were never intended for internal administration.

We may take wood-alcohol, for instance. What multitudes have been deceived into the use of this poisonous drug? There is perhaps no way of reckoning the damage to health caused by its use in flavoring extracts as a solvent, in place of the true ethyl alcohol, used simply on account of its cheapness, and perhaps found out only by some poor mortal's attempting to pollute himself by the use of a flavoring extract as an intoxicating beverage. As we all know, a number of cases are on record where blindness and even death have resulted from such a course of action.

But even though this be true, this is not the commonest of adulterants used to lessen the cost of manufacture, for not only are cheap grades of the crude drug employed, but synthetic methods are in constant use for the imitation of the original and they are far from being without success in meeting the demands of the people. And, we may ask, are the manufacturers not justified in this practice? The great majority of the public custom at the present time prefer the flavor of a synthetic or adulterated product to that of a strictly U.S.P. formula.

Cases are constantly occurring in which customers are angered and even feel insulted by being sold a pure article at pure article prices, expecting to receive something extraordinary, when upon trying their purchase declare it not to be the flavoring desired. So it is easily seen that a dealer is almost compelled to have in stock all grades in order to meet the demands of the public. And why this error or deception of taste? The only way it may be accounted for is in the fact that these false grades have been on the market

until the public has become accustomed to them so that a cheap grade is even more desirable to the misled taste than one of the higher price and standard. Hence can we say that the manufacture and use of these is wholly out of order? If a cheap article is demanded why not have such on the market so long as it better suits the taste and pocket-book of the consumer and at the same time contains nothing injurious to health and is sold for just what it is. But the trouble lies in the fact that there are on the market many brands which contain gross adulteration, but are still sold under the name of a pure article.

In the case of vanilla extract, many brands are prepared from a variety of substances containing a small amount of vanillin with a trace of coumarin, which is derived from the tonka bean, to add a hue to the flavoring and caramel or a coal-tar product to give the proper shade of color.

Scoville says: "Vanillin is fully equal to the finest bean, but is too delicate to compare with natural vanilla, hence the use of coumarin to bring out the flavor." Some may wonder why the manufacturer is so prone to use coumarin for this purpose in preference to the true vanilla. This is easily understood, however, when we know that the true vanilla beans cost from \$5 to \$10 per pound, while tonka beans, from which coumarin is obtained, may be had for 40 to 50 cents per pound.

A favorite formula with many for the manufacture of an artificial grade of extract is the following :

1. Extract of tonka	6 pints
2. Prunes	1 pound
3. Rasins	4 ounces
4. Currants	3 "
5. Peru balsam	3 "
6. Powdered orris root	4 "
Molasses	2 pints
Dil. alcohol q. s. ad 2¼ gal.	

It will be noted that in this formula there is nothing particularly injurious, neither is there anything of high price, but, at the same time, such a so-called extract meets with much favor in the hands of the public.

Following is a cheap yet very clever imitation which answers the purpose very satisfactorily and at the same time is far from being the true vanilla extract :

1. Vanillin	1 gramme.
2. Coumarin	1 "
3. Alcohol	125 c.c.
4. Glycerin	65 "
5. Water	1000 "
6. Caramel q.s. to cover.	

It will be seen that in this preparation there is 0.17, each of coumarin and vanillin. By quantitative tests, made personally, upon various brands of extracts there was found as high as 0.12 per cent. of coumarin with almost a like amount of vanillin, which corresponds, very nearly, to the above formula, yet sold under the name of a true vanilla extract. A common method of adulteration is by the use of a very dilute alcohol, increasing the solvent powers by using an alkali. For the best grades of extract a 50 per cent. alcohol should be used, but there are cases where as low as 10 per cent. has been used, the solubility of the vanilla constituents being increased by the use of an alkali, usually potassium bicarbonate.

Out of six specimens tested, four were found to have contained this alkali to increase the solvent powers of the menstruum, indicating that a dilute alcohol had been used in their preparation.

At this point a discussion of the growing, collecting, and curing of the vanilla bean, so-called, might be opportune, but it will suffice here to state only a few of the important points bearing on the subject.

In the first place it may be said that there are four chief varieties of vanilla, viz.: Mexican, Bourbon, Venezuelan and Brazilian, the two former being considered the better grades, and of these the Mexican being by far the superior. The beans, or fruits, which grow on a vine-like plant clinging to the trees of hot damp woods are collected while green and put through a process of curing or sweating. It is upon the care with which this process is conducted that depends largely the quality of the marketed article. This process is carried on by placing the fruit in flannel cloths during the nights and cloudy weather, and curing in the sun on bright days for a period of several weeks, thus giving alternate sweating and drying. In this operation the beans lose, on an average, 35 per cent. in weight and it is during this time that vanillin, one of the chief constituents of the bean, is developed, though it has been stated by some good authorities that the value of the article cannot be estimated by this alone. Furthermore, during this process of curing there is a certain greyish-white

fluorescence developed on the surface of the fruit which is considered by some to be indicative of good quality and is often imitated in poorer grades by a coating of benzoic acid. This, however, may be easily detected by the usual benzoic acid tests. This method of estimation, for the most part however may not be taken as conclusive of quality for the Mexican, without the fluorescence has been found better than the Bourbon with it.

Although all these points are to be taken into consideration, the consensus of opinion of the best authorities goes to show that a certain peculiar resin is the chief active constituent and the one sought after, hence the presence of this indicates a good grade of flavoring extract. Although attempts have persistently been made to substitute a cheap resin for this one, and even to produce it synthetically, it has not as yet been done with sufficient cleverness to avoid detection if the proper tests be applied. Out of six commercial brands of vanilla extract tested, three were found to contain some foreign resin in a greater or less proportion. (Article in Vol. 47, page 473, *Proceedings of the American Pharmaceutical Association*.) Another substitution for the resin has been found in cork-wood in the form of a certain tannin-like substance, which under certain conditions is capable of splitting up into vanillin and other substances.

Upon making a study of this subject one finds it certainly appalling to know the great variety of adulterations used; in some instances even acetanilide being found present.

Although on account of its popularity, we have treated chiefly of vanilla, it is not alone the extract whose formula is the subject of abuse, for it has been as fully demonstrated that the others have been adulterated with equal cleverness, and most especially that of lemon. For this reason, in this great age of scientific advancement one must be constantly on the alert for those greedy in their deceptive practices.

It may be asked, where would a person go to find a pure extract? We would say, to the drug store and surely not to the grocery. For where is there a class of people more capable of judging the quality of this line of goods than the druggist who has made this line of work his life study and hence is not so apt to be the subject of a fraudulent graft. And too, in cases of necessity, he is capable of manufacturing his own flavorings, thus being able to personally guarantee the quality.

PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING
LITERATURE RELATING TO PHARMACY.

By M. I. WILBERT,
Apothecary at the German Hospital.

The Annual Meetings of the State Pharmaceutical Associations that were held during the past three months have attracted an unusual amount of attention. These meetings were generally well attended and, from available reports, an unusual amount of time appears to have been devoted to the reading and discussion of scientific papers.

Pennsylvania easily leads in the number as well as the variety of communications that were presented, though the reports of practically all of the State Association meetings show a decided increase of interest in the technical side of the pharmaceutical calling. Legislation and other economic features connected with the drug business were also discussed quite freely. Among the numerous suggestions for improving the economic conditions of the retail druggist, the systematic development of the U.S.P. and N.F. propaganda appears to have met with general favor. In this connection it is to be regretted that the fundamental need of this propaganda, the systematic education of the retail druggist himself, has been generally overlooked.

How really pressing this need is was evidenced by the statement made by Prof. J. Hartley Beal, the official drug inspector of Ohio, who found that only 58.2 per cent. of the drug stores that were visited in the State of Ohio possessed a copy of the U.S.P. VIII, and in only 31.1 per cent. of the stores did he find a copy of the N.F. III.

Similar conditions were reported from North Dakota, by Food Commissioner Ladd, who, in a complete canvass of that progressive commonwealth found that out of 190 retail druggists in the State, 124, or a fraction more than 65 per cent., possessed copies of the eighth revision of the Pharmacopœia of the United States.

Pure Drug Bill in New York, referred to in a previous number of this JOURNAL (June, 1908, page 287), was vetoed by Governor Hughes. At the recent meeting of the New York State Pharmaceutical Association the reasons for this veto were liberally discussed

and it was on motion agreed to favor the reintroduction of the bill at the next session of the State Legislature.

The active interest that has been manifested in organization work, promises well for the annual meetings of the National Associations to be held during the coming month. From present indications these meetings will all be of unusual interest and importance. While the wholesale druggists are thoroughly well organized and will probably devote their meeting to the routine discussion of practical subjects, there is, in connection with both the American Pharmaceutical Association and the National Association of Retail Druggists an evident feeling that reorganization along broader and more comprehensive lines would be of advantage to the associations themselves and be a powerful factor for securing for pharmacists and retail druggists the recognition that is rightfully due them.

British Patent Law.—The revision of our own, admittedly liberal, patent laws has long been agitated by pharmacists and others interested in the trade in chemicals for use in medicine. An important precedent, that may be of use as an argument in future agitations along these lines, is to be found in the law recently enacted in Great Britain which will virtually compel the foreign holders of an English patent to produce the protected article in Great Britain within a specified time, or forfeit all property rights in the patent.

Preventive Medicine.—The call to health, as it has been so aptly paraphrased, is attracting widespread attention. The success that has attended past efforts to restrict the spread of diseases has stimulated renewed effort, on the part of medical men, to spread the knowledge of well-known facts relating to hygiene and sanitation. The economic value of public health work has been recognized in a practical way, by both of the large political parties, and it is quite evident that never before, in the history of this country, has the demand for a rational supervision of public health measures been so much in evidence as now.

Medical College Mergers.—The *Journal of the American Medical Association* (July 8, 1908, page 229) announces that in less than three years twenty-three medical colleges have united their forces to form nine larger and stronger ones.

This merger of the medical schools has been the direct outcome of the activity that has been displayed by the Council on Medical Education of the American Medical Association. There can be no

denying the fact that the merging of small, poorly equipped medical schools into a much smaller number of strong, well-equipped institutions forebodes a material advance in the standards of medical education.

The Consolidation of Scio with the Pittsburg College of Pharmacy, as recently announced in the pharmaceutical and drug journals, establishes a precedent that might be followed by other colleges to the material advantage of pharmacy at large.

In pharmacy, as in medicine, it can no longer be expected that the schools can be self-sustaining. In medicine, for instance, it has been actually demonstrated that the annual expenses of the better equipped schools readily amount to double the amount paid for tuition by the students. If pharmacy is to progress, as it should and must, practically the same conditions will prevail with pharmaceutical schools, thus making it impracticable if not impossible to longer continue the smaller, unendowed, colleges of pharmacy.

Food and Drug Standards.—An international congress for suppressing adulteration of foodstuffs and medicines will be held in Geneva, Switzerland, in September. One of the subjects for discussion is a comparison of the demands for purity made by the different Pharmacopœias, the object being to elaborate, if practicable, generally acceptable standards for the more widely used drugs and chemicals. This proposed congress has attracted considerable attention, both in this country as well as abroad, and it is confidently expected that the meetings will be well attended and that the deliberations will be fruitful of permanent results.

An Official Bureau for Testing Pharmaceutical Products was recommended, by Dr. Eichengrün, at the recent meeting of the German Chemical Society. In calling attention to the need for such an official bureau the reader dwelt at some length on the all too rapid increase in the number of pharmaceutical preparations of a proprietary nature, and the fact that the all too frequently untrue and misleading statements that are made regarding composition and uses, by unscrupulous manufacturers, would justify, if not imperatively demand, supervision by some central bureau.

Such a general bureau must consider the general interests of all concerned and would in no way relieve the apothecary or the manufacturer of their direct responsibility for the articles made or sold by them. (*Apothek. Zeit'g*, 1908, page 436.)

Pharmaceutical Chemical Section in the German Chemical Society.—At the meeting of the German Chemical Society, held in Jena, June 10 to 12, 1908, a section for Medico-pharmaceutical Chemistry was formed, with Professor Thoms, Berlin, as chairman.

The section began with a membership of 100, of which number no less than twenty-five are residents of the United States.

The first chairman of the section is well and favorably known in this country. He is the Director of the Pharmaceutical Institute of the University of Berlin, Germany, is a corresponding member of the Council on Pharmacy and Chemistry of the American Medical Association and holds honorary membership in a number of American pharmaceutical societies and associations.

British Pharmacopœia Revision.—The Therapeutic Committee of the British Medical Association has spent much time on the discussion of substances and preparations which it is desirable to omit from and those which it is desirable to add to the coming edition of the British Pharmacopœia.

The principles which have been adopted as a guide for this committee are rather comprehensive, and, in view of the approaching revision of our own Pharmacopœia of the United States, may prove to be doubly interesting.

They include :

The deletion of practically all drugs that are fully represented by an active ingredient.

The deletion of drugs possessing no obvious or serviceable action.

The avoidance of duplication in the preparations of a drug.

The omission of all purely diluent preparations.

The omission of all articles that do not require official definition.

The elimination from the body of the book of articles that are not contained in finished products.

A list containing the drugs and preparations which the committee thinks might be omitted from or added to the Pharmacopœia has been transmitted to the General Medical Council. (*The Chem. and Drug.*, May 30, 1908, page 835.)

The British Pharmaceutical Codex. This book, but recently reviewed in these pages, is already out of print. A second edition is in course of preparation and the opportunity is being taken advantage of to add a considerable number of formulas and to revise some of the monographs in the present first edition.

A supplement, now in press, is designed to supply present owners of the Codex with the more important additions and alterations that have been proposed since the work was published. The price for the supplement from the publishers is 1s. net.

Laboratory investigation of preparations of a proprietary nature is being actively fostered both in this country as well as abroad. A number of interesting reports have been published, particularly in Germany, where work of this kind has met with considerable support from pharmaceutical societies and kindred associations.

An extensive investigation recently reported by the Council on Pharmacy and Chemistry of the American Medical Association relates to :

Diastase Ferments, and includes a comprehensive, comparative study of a number of the proprietary diastase ferments now on the market. In this report the subcommittee making it points out that practically all manufacturers have been making rather misleading claims for their own particular products, and that while some of the articles comply fairly well with the direct claims that are made for them, others fall far short of what might be expected of them, while some are practically inert. The report should be read and pondered over by every pharmacist who is interested in the work now being done by the Council on Pharmacy and Chemistry. It is published on page 140 of the *Journal of the American Medical Association* (June 11, 1908).

Arhovin Capsules were examined by G. Frerichs (*Apothek. Zeit'g*, 1908, page 538), who found them to vary from 54.4 to 103.6 per cent. of the content claimed for them by the manufacturer. Two boxes of fifteen capsules each were found to have an average content of 78.4 and 81.2 per cent. of the amount claimed for them.

Pyrenol tablets were also examined by G. Frerichs (*Apothek. Zeit'g*, 1908, page 521), and the results as published indicate that these tablets, as marketed by the manufacturer, vary considerably in the content of soluble ingredients. A careful examination of a number of specimens showed them to vary from 44.6 to 77 per cent. of the amount claimed for them, thus indicating that the methods of manufacture must be either crude or careless.

Hydropyrin, which is claimed to be sodium acetylsalicylate, was examined by F. Zernik, who found it to contain a mixture of acetic and salicylic acids in addition to the acetylsalicylate. The variable

content of these several acids, both free and in combination, suggests that the acetylsalicylic acid is probably saponified in the course of manufacture and that this change has, as yet, not, been taken into account by the manufacturer. (*Apothek. Zeit'g*, 1908, page 529.)

Synthetic Suprarenin or Adrenine.—Prof. Arthur R. Cushny (*Phar. Jour.*, May 23, 1908, page 668) reiterates the opinions previously published, that natural suprarenin has almost exactly twice the power of the artificial base in raising the blood pressure.

He believes this to be due to the fact that d-suprarenin, which comprises 50 per cent. of the synthetic preparation, is inert so far as the blood pressure is concerned. This assumption appears to be further proven by some experiments he has made with a preparation containing a larger proportion of this dextro-rotatory base.

Arterenol is the name given to a derivative of synthetic suprarenin. It is said to possess similar properties and to have the same action as suprarenin. (*Phar. Zeit'g*, 1908, page 529.)

Homorenan is the name given to an intermediate product obtained in the manufacture of synthetic suprarenin, the properties of which it is said to possess. (*Phar. Zeit'g*, 1908, page 529.)

Valuation of Asafetida.—A. Hellström publishes a lengthy investigation of thirty samples of asafetida. He finds that the permissible ash content in all pharmacopœias is too low and should be raised to 20 or 25 per cent. The relation of resin, oil and gum he finds to correspond to the equivalent of 3 : 2 : 1.

His examinations show the following variations: Ash content from 4 to 39 per cent.; alcohol soluble material from 50 to 66 per cent.; acid number from 20 to 39 per cent.; saponification number from 98 to 112; ether number from 67 to 80. (*Phar. Zeit'g*, 1908, page 428.)

Detection of Barium in Strontium Salts.—Caron and Raquet recommend the use of a mixture of potassium chromate and potassium bichromate for the detection of barium in either strontium or calcium salts. For solutions containing up to 3 per cent. of a strontium salt they recommend a solution of 3 per cent. potassium chromate, with 1.1 per cent. of potassium dichromate.

For solutions containing more than 3 per cent. of a strontium salt they suggest the use of a solution containing from 1.5 to 2 per cent. of potassium chromate with 1 per cent. of potassium dichromate. This reagent is said to demonstrate the presence of 1-15000 part of barium in strontium. (*Apothek. Zeit'g*, 1908, page 439, from *Bull. de la Soc. Chim. de France*.)

Melting Point of Resorcin.—The melting point of resorcin is variously given as being from 110° to 119° C., the latter figure being that included in the U.S.P.

The German Pharmacopœia gives the melting point of this substance as varying from 110 to 111, and this has recently been demonstrated to be correct; by C. T. Bennett, who found the melting point of ordinarily pure resorcin to be 111 while the melting point of a purified specimen, recrystallized from benzole, was found to be 110. (*Phar. Jour.*, 1908, page 758.)

Mexican Poppy Seed Oil.—The seeds of *Argemone Mexicana* yield 37 per cent. of a fixed oil that is said to have cathartic properties. It is said that this oil has long been in use in India as an external remedy for itch, ringworm and skin diseases generally, as well as for headache following exposure to the sun. (*The Chem. and Drug.*, June 13, 1908, page 896.)

Acetatoxyl, as its name indicates, is an acetyl combination of atoxyl. It occurs as a white crystalline powder that contains from 3 to 4 molecules of water of crystallization and is readily soluble in 10 parts of water, it is much more readily soluble in hot water. Acetylatoxyl is not easily decomposed and solutions of it can be sterilized by boiling. It is said to be similar to atoxyl in action and efficiency and may be given, subcutaneously, in daily doses of 0.6 gramme. (*Phar. Zeil'g.*, 1908, page 608.)

Arsacetin is a trade name given to acetylatoxyl, the acetyl combination of atoxyl.

Agaroma is a preparation of agar-agar that is being marketed as a cure for constipation. The preparation is supplied with various aromas and is said to be quite agreeable. (*Süd. Deut. Apoth. Zeil'g.*, 1908, page 382).

Regulin, a mixture of dry agar-agar with an extract of *Cascara Sagrada*, has been marketed in this country for some time. It would appear to be similar in properties and action to the mixture described above.

Diaspirin is said to be the succinic acid ester of salicylic acid. It occurs as a white, crystalline powder, having a slightly acid taste, and melts from 176° to 180° .

It is only slightly soluble in water, but much more readily soluble in alcohol, acetone or glacial acetic acid.

Diaspirin may be given in all cases where salicylic acid is indicated. It is said to be an active diaphoretic. May be given in

doses of 1.0 gramme several times a day. (*Phar. Zent'h*, 1908, page 399.)

Eucol is the name given to guaiacyl acetate which is said to be more easily saponified than any guaiacol ester so far experimented with.

From experiments on rabbits it is found to be readily absorbed. The guaiacol present is eliminated in the urine as sulphoguaiacol, soon after ingestion. (*Phar. Jour.*, 1907, page 789, from *Nouv. Rem.*)

Eustenine is a name given to a double salt of theobromine sodium-sodium iodide, thus being somewhat analogous to diuretin in composition. It is said to contain 51.1 per cent. of theobromine and 42.6 per cent. of sodium iodide.

Eustenine occurs as a white powder having a decidedly bitter taste. It is preferably administered in capsules or cachets and may be given in doses of 0.5 to 1.0 gramme. (*Phar. Zent'h*, 1908, page 552.)

Iodomenin is an iodo-bismuth albumen compound that is said to be useful in place of the alkaline salts of iodine, particularly in cases where iodine is to be given for a continued length of time. It may be given in doses of 0.5 gramme three or four times a day. (*Phar. Zeit'g*, 1908, page 529.)

Neoform is said to be a basic tri iodo phenol bismuth. It occurs as a yellow, nearly odorless powder and has been recommended as a dusting powder for wounds. (*Phar. Zeit'g*, 1908, page 529.)

Ostauxin is a name applied to calcium paranucleinate which is said to be prepared from casein by digesting with pepsin and hydrochloric acid. This substance occurs as a fine, tasteless powder, easily soluble in water, and contains 17 per cent. of calcium, 9 per cent. of nitrogen, and 2.5 per cent. of phosphorus.

The preparation is designed to assist in the development of bone tissue and to promote metabolism. The dose is from 1.0 to 2.0 grammes three times a day. (*Phar. Jour.*, 1908, page 806, from the *Lancet*).

Sakuranin is the name given to a glucoside that has been isolated from the bark of *Prunus pseudo cerasus*, by Ashina. It occurs as white, bitter tasting needles that melt at from 210° to 212°, and are not soluble in cold water or in ether, they are readily soluble in diluted alcohol and in hot water. (*Phar. Zent'h*, 1908, page 426, from *Jour. Phar. Soc. of Japan*.)

BOOK REVIEWS.

ARBEITEN AUS DEM PHARMAZEUTISCHEN INSTITUT DER UNIVERSITÄT BERLIN. Herausgegeben von Dr. H. Thoms, Professor und Direktor des Pharmazeutischen Instituts der Universität, Berlin. Vierter Band, umfassend die Arbeiten des Jahres 1906.

During the year 1906, eighty-one investigations were carried on in the Pharmaceutical Institute of the University of Berlin. These included investigations of new chemicals; proprietary remedies; and synthetic organic products; chemical pharmacognostical and chemical-physiological studies; the preparation of galenicals and the examination of food and technical products.

F. Zernik examined the following new remedies: Alypin, aspirophen, salicylic derivatives of benzosalin, Formurol, Migranin Höchst, Neu-Sidonal, Proponal, Sajodin, Sulfopyrin, Beta-Sulfopyrin and Thephorin.

J. Kochs examined the following: Antineurasthin, Antipositin, Antisanguin, Augenwol, Ayer's Cathartic Pills, Brandol, Burkhart's Kräuterpillen, Coricol and Assanol, Cista, Creolin Pearson, Anna Csillag's Haarwuchsmittel, Dattel-sirup, Diabet-Eserin, Divinal, Eidol, Epilepsie-mittel, Estor's Vaginalstifte, Fascolsalbe, Fleur de Cologne, Formosa-sprudel, Fulgural, Gallensteinmittel, Grandira, Grazianapräparate, Grossmann's Kraft- und Nähremulsion, Haarfärbemittel, Dr. John P. Haig's Goitre Cure, Dr. B. W. Hair's Asthma Cure, Hair Grower, Dr. P. Harold Hayes' Asthma-Medizinen, Henkel's Schmerzlose Pulpaentfernungstinktur, Isu, Kapitoll, Ketel's Antiscabin, Kopfschmerzpulver und Bandwurmmittel, Kruppmittel, Lithosan, Lytrol, Melal, Menstruationspulver Geisha, Myrtill-Laxiersaft, L. and G.'s Nervenheil-Zigarre, Okertin, Ophthalmol, Pallabona, Pararegulin, Pilules du Dr. Laville, Plantal, Plougmann's Dänisches Viehpulver, Poudre uterine de Roux, Reichel's Hustentropfen, Rheumatismuspulver, Dr. Ernst Sandow's künstliche Mineralwassersalze, Styptogan and Thelyolipsalbe.

E. MERCK'S ANNUAL REPORT. Complete Series. Volume XX, 1906. Darmstadt, May, 1907.

This is a report on the advancements of pharmaceutical chemistry and therapeutics during the year 1906. Valuable information is given concerning several hundred chemical substances and pharmaceutical preparations, about 400 pharmaceutical, chemical and medical journals having been consulted.

REPORT OF THE THIRTY-FIRST ANNUAL MEETING
OF THE PENNSYLVANIA PHARMACEUTICAL ASSO-
CIATION.

BY C. H. AND M. R. LAWALL.

(Continued from page 403.)

At this point Mr. M. N. Kline, of Philadelphia, desired the privilege of the floor, regretting that he had not been present at the previous session when the delegates were called for from the National Wholesale Druggists' Association. He desired to say a few words upon the general subject of legislation, in which the druggists are interested. He called attention to two present-day tendencies in the matter of this particular kind of legislation, one exceedingly gratifying and the other calling for our attention and interest. He spoke of the passage of the Food and Drugs Act in June, 1906, and commended it as a basis for the States to take into consideration in forming laws, which has already been done in a number of Commonwealths. With the exception of Oklahoma and Louisiana, where there have been introduced provisions which are more or less radical from our standpoint, the matter of legislation accomplished, on the whole, calls for congratulation. The tendency of which he particularly wished to speak, because our own law has not yet been enacted, is the fact that in many of the States the regulation of the sale of medicines under these laws has been placed in the hands of people who are not pharmacists, and who are, therefore, not best qualified to enforce the various provisions. The second tendency to which he called attention was the injection of what might be called practical politics into legislative matters of this kind. He warned the members against a law which is now pending in Congress, which was introduced during the closing of its first session by Congressman Mann, which he considers a most specious piece of legislation. It is intended to prohibit the sale of habit-forming drugs; but its provisions in some respects are so radical, that they require modification in order to prevent its working a hardship upon the members of the drug trade. He concluded by calling attention to the manner in which physicians have come together on legislative matters, and suggested that the pharmacists do the same.

Mr. Emanuel arose and defended the present Pennsylvania law,

calling attention to the fact that some of the provisions of the national law are based upon the present Pennsylvania pharmacy law, which was the first one to introduce the N.F. as a standard. He stated that he believed it was a mistake to allow preparations deviating from the official standards to be sold, even if so labeled. He also stated that we have at present all the legislation that we need in this State, and what is needed more is the means to carry on the work. A number of violators of the Pennsylvania law have been prosecuted within the last six months, and the attorneys for the Board declare that the law will stand the test of suits of this character. The law of 1887 was practically useless, because it had to be proved that the adulteration was intentional. The present law goes somewhat to the other extreme, but if wisely administered it is all right.

Mr. Kline, in response to a question as to what the provisions of the bill introduced into the last Congress were, stated that it was too long to give all the details, that the particular provisions affecting druggists are those applying to the manner of labeling poisons.

After some further discussion it was decided to have the bill printed in full in connection with Mr. Kline's remarks, and published in the Proceedings of the Association.

Mr. L. L. Walton asked that the report of the committee who have collected funds to reimburse the pharmacists who paid damages in the Loder suit be made a special order of business at the next morning's session.

The chairman of the Committee on Papers and Queries then assumed charge of the meeting, and a paper was read by Mr. Frailey, entitled "A Reversal of Policy."

Mr. C. L. Bonta, of Oak Lane, Pa., read a paper upon the "Druggist's Own Circulating Library." The paper was discussed by Dr. Lowe, who questioned whether it would be profitable in all stores, as his own experience had taught him that many books are stolen. Mr. Bonta, in reply, stated that he had had only one book stolen in thirteen months, and that he considered it brought business in other lines.

A paper was then read by Mr. Emanuel upon some questions arising in Board of Pharmacy examinations.

The Committee on Time and Place of meeting unanimously recommended that the Association meet at Bedford Springs in 1909.

After some short discussion, it was put to a vote and unanimously carried in favor of Bedford Springs.

Chairman Gorgas, of the Committee on Nominations, then submitted a report, and the following officers were unanimously elected to serve the Association for the ensuing year: President, L. L. Walton, of Williamsport; first vice president, Charles Leedom, Philadelphia; second vice-president, George D. Kressler, Bethlehem; secretary, E. F. Heffner, Lock Haven; treasurer, Joseph L. Lemberger, Lebanon; Executive Committee, Walter Rothwell, Hatboro, chairman; Louis Saalbach, Pittsburg; Louis Frank, Wilkes-Barre, Pa.; C. H. Marcy, of Altoona, was then elected local secretary for next year's meeting.

The reading of papers was then resumed, and E. F. Heffner read a paper entitled "Why a Pharmacist Should Make His Own Preparations," followed by a paper by B. E. Pritchard, "The Vagaries of the Law." This paper was discussed by Messrs. Kline, Emanuel, Lowe, Remington and Walter V. Smith, who took up the particular feature of the paper relating to the illegal sale of cocaine, and confirmed the statements made by the author of the paper, that there was practically no check in the sale and use of cocaine since the passage of the law.

The meeting then adjourned until 10 A.M. Thursday.

The Third Session of the Association was held at 10 A.M. Thursday. After reading and approving the minutes of the previous session, the committee on the fund to reimburse the druggists who lost money in the Loder suit reported that over eleven hundred dollars had been collected, and a detailed list of the contributors was given, after which a committee of three was appointed to audit the accounts of the committee.

The Committee on President's Address then reported upon the various recommendations, they being taken up seriatim and individually approved after considerable discussion.

Prof. J. P. Remington then read the report of the committee appointed to draw up resolutions upon the death of Secretary Dr. J. A. Miller. After these resolutions had been adopted by a rising vote, Col. H. C. Deming, of Harrisburg, read an eloquent tribute to the memory of Dr. Miller.

Mr. J. G. Bone, of Dunmore, made a short speech on the subject of Sunday closing, which led to a discussion participated in by Mr. Horn, of Carlisle, and President Lowe.

The Association then passed a motion to pay L. L. Walton one-third of the secretary's salary for his services since Dr. Miller's death.

C. H. LaWall took charge of the meeting, and a paper was read by Mr. M. I. Wilbert on "The Trend of Education in Matters Medical," which was illustrated by specimens of preparations.

Mr. J. Percy Remington then read a paper on "Capsule Filling," and gave a demonstration of a new device for filling dry capsules at the prescription counter.

Prof. I. V. S. Stanislaus then read a paper, entitled "A Few Laboratory Notes," in which he gave practical working formulas for several unofficial preparations in frequent demand.

Mr. Ambrose Hunsberger read a paper on "Strontium Bromide of the U.S.P., Eighth Revision," which was followed by a paper by Mr. E. Fullerton Cook, on "A Professional Pharmacy."

The meeting then adjourned until 2.30 P.M.

At 2.30 P.M., after the reading of the minutes of the morning's session, a reply was read from the Governor, acknowledging the receipt of the telegram sent him with reference to the appointment of Mr. Cliffe. The meeting was again turned over to the Committee on Papers and Queries. Papers were read in answer to Query No. 8, as to the advantage of buying a year's supply of patent medicines, by Mr. F. M. Apple and Mr. J. K. Thum, both of whom answered the query in the negative. Mr. C. E. Vanderkleed then read a paper, entitled "Can Uniform, and Therefore, Standard Tinctures Be Prepared from Standard Drugs Without Assaying the Finished Product?" The author gave statistics favoring the negative side of the question.

The paper by Dr. Samuel G. Dixon, in answer to the query as to whether the distribution of free antitoxin by the State Health Department was worth while, was read by Mr. E. F. Heffner. Dr. Dixon emphatically answers this question in the affirmative, giving the statistics to show that the actual mental gain to the State was many times in excess of the cost.

Miss Mary E. Tassell read a paper, entitled "Women in Pharmacy," which occasioned quite a discussion, participated in by Professor Remington, Colonel Deming and Mr. Pritchard, all of whom paid a tribute to woman's work in pharmacy.

Papers on the U.S.P. and N.F. propaganda were then read by B.

E. Pritchard, F. M. Apple, Christopher Koch, Jr., and F. H. Cope, in which the subject was treated from various standpoints, and which created a lengthy discussion, participated in by Messrs. Bone, Wilbert, Apple, Koch, Cope, Kressler, Osterlund, Krause and Stanislaus, during which many valuable points were brought out, particularly as to the value and method of detailing physicians with regard to the preparations taken up.

Mr. C. L. Bonta then gave an interesting ten minutes' talk on advertising, illustrated by a number of charts prepared for the purpose. Mr. Bonta was granted a rising vote of thanks on motion of Mr. Bone.

A paper on a new form of mixing device by Mr. I. M. Weills, of Harrisburg, was read by Mr. Croll Keller, who showed the actual working of the apparatus. On motion, it was decided to include a photographic reproduction of the device in the Proceedings.

Mr. Cliffe read two papers, by Mr. G. M. Beringer, on the subject of synonyms of some of the more common preparations, after which the meeting adjourned.

The last session of the Association was held on Thursday evening at 8.30 o'clock. A paper was read by C. H. LaWall, entitled "The Label and the Law," which was followed by a short paper on "A Novel Window Display," by Mr. R. H. Lackey. Chairman LaWall then read by title over twenty papers which had been presented, and which could not be read on account of insufficient time, after which the officers for the ensuing year were installed.

A feature of this year's closing session was the introduction of a new body, called "The Salesmen's Auxiliary," with a membership of about fifty, Mr. Frank W. Smith, of Philadelphia, being President; Mr. A. L. Wolcott, of Philadelphia, Secretary, and Mr. McFerran, of Philadelphia, Treasurer. After the re-appointment of Messrs. Bransome, Byers and Busch, and their installation as the Entertainment Committee for the coming year, the Association adjourned to meet at Bedford Springs in June, 1909.

THE FOLLOWING ARE ABSTRACTS OF SOME OF THE
PAPERS:

THE FORMATION OF PRECIPITATES BY SOLUTIONS OF IODIDES IN
ENZYME ELIXIRS.

By H. C. Blair.

The author calls attention to the fact that solutions of the iodides and also of the bromides produced precipitates in compound digestive elixir and essence of pepsin, and on standing for some time, such solutions become darker in color and lose their agreeable odor and taste. He advises that as these elixirs are very often given merely as vehicles, a line of palatable, non-medicinal elixirs be offered to the physician for this purpose.

BEEF EXTRACTS.

By H. A. Bradshaw.

Comparative analyses are given of a number of brands of beef preparations, showing the presence of potassium nitrate resulting from the use of cured meat instead of fresh meat in making the preparations.

THE ESTIMATION OF ACETANILID, PHENACETIN, HEROIN, AND
HEROIN HYDROCHLORIDE.

By Edward S. Rose and Maxwell M. Becker.

A simple and satisfactory process for the estimation of any one of these four substances is given by the use of sulphuric acid and distillation, the liberated acetic acid being titrated. Comparative figures are given, showing the accuracy of the process when used with mixtures of known composition.

IMPROVED ELIXIR OF TERPIN HYDRATE.

By P. Henry Utech.

The author states that the objections to the U.S.P. and to the N.F. elixirs are, first, their exceptionally high alcoholic content, and second, the minimum amount of medicament. He suggests the following formula: Terpin hydrate, powdered, 256 grains; acetic acid, 80 minims; Tr. sweet orange peel, 2 fluidrachms; alcohol, 8 fluidounces; glycerin, 4 fluidounces; aromatic elixir, q. s., 16 fluidounces. He states that this preparation will not precipitate, even when exposed to freezing temperature, and that it can be administered with resinous tinctures without precipitation.

CAN UNIFORM AND THEREFORE STANDARD TINCTURES BE PREPARED
FROM ASSAYED DRUGS WITHOUT ASSAYING THE FINISHED
PRODUCTS?

By C. E. Vanderkleed and L. H. Bernegau.

The authors give the results of a number of assays of tinctures made in various ways in support of the conclusion that uniform tinctures cannot be prepared from assayed drugs without an assay of the final product, the theoretical reasons for variation being due to several causes, as follows: (1) The drug may have a different strength from that given, due to moisture variation or other causes. (2) Faulty manipulation or imperfect percolation. (3) Lack of comparability of the menstrua used in exhausting and assaying the drug. (4) Differences in cellular structure and fineness and uniformity of the powder. Details are given of investigation of the following tinctures: Aconite, belladonna, colchicum, digitalis and nux vomica.

HAS THE FREE DISTRIBUTION OF ANTITOXIN BY THE STATE BEEN
TAKEN UNFAIR ADVANTAGE OF, AND HAVE THE RESULTS
WARRANTED THE EXPENSE?

By Samuel G. Dixon.

This query is emphatically answered in the affirmative as regards the last part of it, by the author, who gives statistics for two years from the Health Department of the State, showing that of 8,833 cases of diphtheria treated, only 807 resulted fatally. In addition, the free antitoxin was used during this same period to immunize 6,184 persons, of whom only 53 afterwards contracted the disease. The cost of thus protecting more than 15,000 persons was \$40,826.-25, and at a conservative estimate of the cost of human life, this investment in one generation should yield a return of more than forty-two millions of dollars.

The author wholly commends the efficient manner in which the pharmacists have co-operated in the work of the Department, as the majority of the 532 distributors scattered throughout the State are the leading pharmacists in their respective localities.

STRONTIUM BROMIDE, U.S.P., EIGHTH REVISION.

By Ambrose Hunsberger.

The author has made an investigation of the correctness of the statement which is frequently made that the chemical manufacturers of the United States do not supply the grade of strontium bromide

corresponding to the requirements of the U.S.P. A list of questions was sent to each of a number of chemical manufacturers, asking for specific information along this line, and samples were obtained in the open market, of the product as supplied by these same manufacturers. Comparative tests were made with these samples and the samples of the imported product, with the result that the product as supplied by the American manufacturers was found to be far superior to that of foreign origin.

ORANGE FLOWER WATER AS A PERFUME AND FLAVOR

By William G. Greenawalt.

The author states that very satisfactory results were obtained in the disguising of the odor and taste of pepsin by the use of orange flower water as a flavor, stating that four ounces of the concentrated orange flower water will satisfactorily flavor a gallon of elixir of pepsin, one sample having retained its pleasant flavor for five years.

REDIVIVUS.

By Joseph P. Remington.

The author refers to the fact that the present revival in medicine and prescription writing is due to the era of common sense and science which has been inaugurated, and which is relegating the facts, fancies and follies of therapeutics to their proper place. The search for panaceas and specifics in medicine will always be fruitless, but the investigator should not be discouraged but commended for his researches.

There are two types of workers at present. The enthusiast who makes the discoveries and the wise servant who preserves them. Each of these is necessary. It is the province of therapeutics to indicate and select the drug. The form of administration is left to pharmacy. A campaign of education is needed to convince the laity that specifics and panaceas are non-existent for the physician. Attempts to practice medicine with one remedy, given in the same dose for all conditions of a certain disease, is following the principles of a nostrum, if ever a nostrum had a principle.

The author referred to the rise of homeopathy, osteopathy and Eddyism, and attributes the great use of nostrums to the fact that faith in the regular practice of medicine was shaken because rational and scientific therapeutics had not kept pace with other sciences. Preventive medicine is not the great Moses who is to lead the regular

physicians out of the wilderness of confusion and doubt, although its importance must be understood, and full credit must be given to those heroes who have risked their lives in the investigation of the methods of preventing yellow fever, smallpox and diphtheria.

Many physicians make the mistake of advising patients who cannot afford it, to take expensive trips or to rest completely from business cares for a long period. The patient appreciates the value of this advice, but being unable to follow it, has recourse to the nostrum. The chance selection may result favorably, and the nostrum gets the credit which the physician might easily have obtained for himself had he written a prescription applicable to the condition of the man's disease, even though it would have been preferable to have had his original advice followed. The patient should be regarded as one who visits a physician because he thinks his condition is serious enough to warrant the necessary financial outlay, having waited for Nature to cure him, and having probably tried household remedies and the recommended nostrums, and he has the right to ask that his adviser will consider his case of sufficient importance to write out an original prescription especially adapted to the treatment of his ailment at the time of the visit.

The consensus of opinions expressed by eminent therapeutists at recent meetings of the medical profession was that the U.S.P. contains preparations fitted for the treatment of practically every disease. A better knowledge of the use of drugs for various diseases and various stages of the same disease, is now demanded. The nostrum business should be relegated to the background. The visit of the physician to the store should be encouraged. The professional knowledge of the pharmacist should always be at the service of the practitioner. No service is too hard or too trivial to aid the physician in any capacity.

The great danger lies in becoming tired or lukewarm in the movement and falling back into the old rut, and the vicious idea that one is in the drug business to sell the goods upon which he can make the most profit. The shelves should be filled in advance of an order or prescription with at least moderate quantities of official preparations, and care should be taken that they are official preparations in name and fact.

Following these ideas the future is full of promise, and it will be possible to stem the tide of drugless cures, psycho-therapy and the nostrum evil.